Kongeriget Danmark

Patent application No.: PA 2003 00057

Date of filing: 20 January 2003

Applicant:
(Name and address)
ProAc ApS
Vildrosevej 3
DK-3500 Værløse
Denmark

Title: Safety screws for securing objects against unauthorised removal.

IPC: -

This is to certify that the attached documents are exact copies of the above mentioned patent application as originally filed.

Patent- og Varemærkestyrelsen Kongeriget Danmark

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH
RULE 17.1(a) OR (b)

Patent- og Varemærkestyrelsen
Økonomi- og Erhvervsministeriet

10 September 2003

Bo Z. Tidemann

PATENT- OG VAREMÆRKESTYRELSEN

SAFETY SCREWS FOR SECURING OBJECTS AGAINST UNAUTHORISED REMOVAL

Introduction

The invention provides novel safety screws that can be used to secure a diversity of objects against unauthorised removal. The safety screws of the invention combine the attributes of ordinary screws with the ability to be converted into a safety screw by any of a number of very simple operations. Screws based on the invention can thus be mounted as ordinary screws using a variety of standard tools and, once mounting is satisfactory, turned into a safety-screw that cannot be easily removed by unauthorised persons.

Background

Screws that are difficult to remove once they are mounted have been developed as a means of securing a diversity of valuables and other objects against theft and unauthorised removal.

One approach has been to design screws that handles normally but requires the use of special/individualised tools that are not broadly available. Screws based on this principle are commonly used as a means of for instance securing wheels on automobiles against theft. Since such safety screws can be both fastened and removed with equal ease by anyone who has the required tool, the protection they offer against theft is obviously limited.

The other approach has been to design the safety screw such that it can use standard tools for mounting but such that it cannot be removed by the same means that was used to fasten it. Such safety-screws carry a slot that only allows clock-wise rotation thereby preventing the screw from being removed once fastened. Whereas screws based on this principle, offers better protection against theft than safety-screws that handles normally but requires special tools, it suffers from a number of disadvantages that has limited their use. Firstly, the uni-directional design of the screw slot complicates fastening as the mounting tool easily "slips out" of the slot. Secondly, any mistakes that occur during mounting and which requires full or partial removal of the safety screw are extremely difficult to correct. Thirdly, the unidirectional principle, for all realistic purposes, is limited to the standard screw slot which is increasingly being phased out as more user friendly designs such as countersunk screw-heads for Allen keys, Parker's screw drivers etc. etc. have appeared. Also, the unidirectional principle is not applicable to bolts with hexagonal blot heads for spanners and monkey wrenches.

Given the above, it is a principal object of the present invention to provide safety screws/bolts that handles as normal screws/bolts *i.e.* allows bi-directional rotation, can be fastened by a variety of contemporary fastening tools and which at the same time provides substantial protection against unauthorised removal.

It is a further object of the present invention to provide very large safety screws, termed safety anchors, which are easy to install/uninstall into soil, sand etc. for the user but very difficult to remove for un-authorised person without attracting significant attention. As such, a safety anchor can function as a portable attachment points for securing a variety of valuable objects and devices against theft and unauthorised removal in public and semi-public places.

Devices that can be anchored into - and removed from - the ground by a rotating movement similar to the safety-anchor described herein and used as an attachment point for a variety of different devices are known, such as for instance the eartwormTM (www.theearthworm.com) and the beach-anchor (www.beachstuf.com). Contrary the the safety-anchor of the present invention, however, none of these devices include features that offer protection against unauthorised removal. As such, they are not useful as attachments points for valuable items that are attractive objects for thieves.

Description of the invention

To deal with the difficulties and drawbacks of contemporary safety screws, the invention provides novel safety screws that combine the attributes of ordinary screws with the ability to be converted into a safety screw by any of a number of very simple operations. Screws based on the invention can thus be mounted as ordinary screws using a variety of standard tools and, once mounting is satisfactory, turned into safety-screws that cannot be easily removed by unauthorised persons.

In a preferred embodiment, the safety screw of the invention consists of at least a rod and a threaded tip, which are interconnected in a joint that allows transmission of rotational movement from the rod to the threaded tip in one locked state (the operational state) and prevents such transmission in another unlocked state (the safety state).

In the operational state, the safety screw thus behave as ordinary screws that can be fastened or removed by either clockwise or counter-clockwise rotation using appropriate tools to apply torque to the screw-head. Once the screw is fastened satisfactory it can then be converted into a safety screw by switching to the safety state in which rotational movement between the rod and threaded tip is decoupled.

The ability to shift between an operational and a safety state can be provided by for instance designing the safety screw such that it contains a hollow channel that runs through the length of the rod and into the threaded tip and wherein a locking element can be inserted that – depending on its position in the channel - either couples (operational state) or decouples rotational transmission (safety state) between the two parts. The internal channel in the safety screw may be a square hole into which a locking element is inserted that has a cylindric shape at the proximal end (screw-head end) and a square

shape, which fits the square hole, at the distal end (threaded tip end). When the locking element is located such that its square section spans the joint between the rod and threaded tip the two section are rotationally locked and the safety screw is thus in the operational state. Conversely, when the square part of the locking element is located exclusively in either the rod or the threaded tip, or if it is completely removed from the safety screw, the rod and threaded tip are rotationally decoupled and the safety screw is thus in the safety state.

In one embodiment of the invention the safety screw is so designed that the locking element is accessible from the screw-head end and such that the safety state is achieved by driving the locking element deeper into the safety screw (push-down safety screw, see figure 1). Simultaneously with converting the screw to a safety screw this action prevents the insertion of another locking element that could re-establish the rotational lock. Safety screws of this design (irreversible safety screws) are therefore extremely difficult to remove once the have been fastened which makes them ideally suited for securing valuables and other objects that are left unattended for extended periods of time.

In another embodiment of the invention, an irreversible safety screw is provided by designing the locking element such that it breaks when a pre-defined torque is applied to the screw (torque safety screw, see figure 2)). In this case, the internal channel that houses the locking element need only extend a little from the joint into the rod and threaded tip. By using different materials and sizes of locking elements, screws may be manufactured that converts into safety screws at a wide range of specifically applied forces. If materials such as plastic, polymer or a soft metal such as copper or lead, are used for the locking element the breaking process will start with a deformation and therefore be slow. In contrast, if the locking element are made of a ceramic or a hard metal, the breaking process will be sudden. The size of the force that is required to break the locking element can be displayed on the screw in a number of ways such as for instance as a number that designates the required torque or a colour code. In a special design, the safety screw is supplied separately from the locking element thus allowing the user to decide the torque required for converting the screw to a safety screw by choosing between a number of different locking elements. In this design the rotational joint is locked by insertion of the locking element into a slot that is accessible from the side of the safety-screw.

In some cases it may be desirable that the safety screw can be shifted between the operational state and the safety state (reversible safety screws) so that the user may remove the object secured by the safety screw by the same means that was used to fasten it. In a preferred embodiment of the invention the safety screw is therefore designed such that the safety state is achieved by removal of the locking element (pull-out safety screw, see figure 3). Holders of a correct locking element can thus always remove the safety screw by re-insertion of the locking element whereas persons that do not have a correct locking element cannot. To increase the security of this embodiment the channel in the

safety screw and its corresponding locking element can be provided in a large number of different designs.

In another embodiment of reversible safety screws, the rod carries a lock, which upon entry of a code or by the use of a key, enables shifting between the operational state and the safety state (lock safety screw, see figure 4).

Safety screws based on the invention can have a range of different design thus providing many manufacturing options. Figure 5 depicts a number of such designs. A person skilled-in-the-art, however, will appreciate that the functionality of the safety screws according to the invention can be obtained with a variety of other designs which thus fall within the spirit of the invention. In one design, the rotational joint between the rod and threaded tip is a closed flanged joint (figure 5a). In this case, pushing the two matching parts together end-to-end assembles the safety screw. Optionally, such an assembly process may involve cooling the rod and heating the threaded tip or *vice versa*. Alternatively, as the rod and threaded tip cannot slide sideways relative to each other once the safety screw is mounted, the flanged joint between the rod and the threaded tip may also be open thus allowing easy side-to-side assembly (figure 5b).

The rod and the threaded tip may also be designed such that they are assembled by the use of a locking ring (figure 5c) or the rod and threaded tip may each carry a flange that enables end-to-end or side-by-side assembly via a separate connective part (figure 5d). The connective part may be made of a range of different materials, such as for instance plastics, polymers, metals etc. The flexible materials may be most suitable for manufacturing a connective part used for end-to-end assembly of the rod and threaded tip whereas non-flexible materials may be most suited for manufacturing a connective part used for side-to-side assembly of the rod and threaded tip.

The rod, the tip or both may be manufactured in more than one part. For instance, the rod may be manufactured in two parts that are assembled side-to-side together with the threaded tip (figure 5e). In this case, the two rod-halves may be held together by for instance matching flanges or one or more locking rings. Also, the rod and threaded tip may also be such that screwing can assemble them. In this case, both halves carry a matching uni-directional thread that does not allow the two parts to be screwed apart once assembled (figure 5f).

Depending on the intended application of the safety screw the rod may be longer or shorter than the threaded tip or of equal length, or the rod may or may not carry a part of the thread. Guidance for selecting the appropriate safety screw can be provided by realising that unauthorised removal of a fastened safety screw will require digging sufficiently deep into the material into which the safety screw was inserted to enable a rotational grip on the threaded tip. When safety screws are used to install objects, such as for instance anti-burglar mounts on doors and windows, the metal mount itself significantly hamper the "digging" possibility thus facilitating the use of safety screws with short rods

and hence long threaded tips that provide powerful anchoring. Conversely, longer rods would be more useful when the safety screw is used to fasten objects in soft materials and /or to fasten objects that do not themselves provide protection against digging round the safety screw. In a preferred embodiment, a set of rods and threaded tips of different length and sizes are designed such that they can be combined freely and assembled easily by the user to suit the task at hand.

A variety of materials such as for instance plastics, polymers and metals may be used for manufacturing the safety screw of the invention and more than one material may be used in a safety screw. Likewise, the safety screw of the invention can be manufactured with all standard gripping means such as for instance the normal hexagonal blot heads for spanners and monkey wrenches, but also countersunk screw-heads for Allen keys, ordinary screw drivers, Parker's screw drivers etc. Also, the principle of the invention applies equally well to other types of fasteners than screws, such as for instance bolts.

The principle of the invention *i.e.* a screw that behaves as a normal screw until converted into a safety screw by dislocating, removing or breaking an element that rotationally connects a rod and a threaded tip, applies equally well to very small fasteners as well as very large ones. Depending on the specific application the size of safety screws may range from radial sizes of a few millimetres and lengths of a few centimetres to screws having a radial size of up to 0.25-0.5 meters and a length of several meters.

It is a particular objective of the invention to provide very large safety screws, termed safety anchors, which are easy to install/uninstall into soil, sand, etc. for the user but very difficult to remove for un-authorised person without attracting significant attention. As such, a safety anchor can function as a portable attachment points for securing a variety of valuable objects and devices against theft in public and semi-public places. Such objects and devices include, but are not limited to beach-umbrellas, game poles, bags, water-crafts, bicycles, fishing rods, guns and other weapons used in the field, tools and machinery used outdoor in workplaces, products on display at shows and outside shops, sculptures and pottery located in gardens, etc. many of which are attractive objects to steal for thieves.

In a preferred embodiment of the invention the safety-anchor is designed to function as a secure attachment point for the beach safety-box described in PA 2002 01213. Briefly, such beach safety-boxes are useful for providing secure on-site-storage of an assortment of valuables such as cash, credit cards, cellular phones, watches, electronic devices, etc., that people typically bring with them to beaches, camping places, outdoor concerts, festivals etc. and which constitute prime targets for thieves

Similar to safety screws, the safety anchors based on the invention can have a range of different designs thus providing many manufacturing options. Also, safety anchors may be manufactured from a range of different materials such as plastics, polymers and metals or a mixture hereof. Figure 6 depicts a possible design of a beach-anchor wherein the rod in

addition to carrying a mount for attaching a beach safety-box is provided with eyelets, hooks or other types of mounts useful for holding and/or securing a number of other devices and items. A person skilled-in-the-art, however, will appreciate that the functionality of the safety anchor according to the invention can be obtained with a variety of other designs which thus fall within the spirit of the invention. Briefly, the safety-anchor consists of a threaded tip and a multifunctional rod, which is connected through a joint which, through the action of a locking element located in a hollow channel within the safety anchor, enable transmission of both clockwise and counter clockwise rotating movements of the multifunctional rod into the threaded tip in one locked state (operational state) and in another position decouples this transmission (safety state). In the operational state the user can thus easily screw the safety-anchor firmly into the ground as well as remove it by rotating the multifunctional rod (using a loose installation-bar) whereas none of these operations are possible in the safety state. Thus, once the safety-anchor has been firmly anchored into the ground it can be protected significantly against unauthorised removal by i) shifting the locking element to the safety position using the locking element handle which is located at the end of the multifunctional rod which is above ground and ii) securing the locking element such that it cannot be operated by an unauthorised person, e.g. by for instance mounting a beach-safety-box or by using a padlock.

Preferably, the safety-anchor is designed in such a way that it allows the locking element to move reversibly between the operational position and the safety position thus enabling the user to shift the anchor between a locked and an unlocked state for mounting, removing or securing the anchor, respectively.

The anchor may further comprise a handle member arranged to control the moving of the locking element from the distal end of the rod, i.e. the end opposite the end where the rod is attached to the threaded tip (figure 7). The handle member may advantageously be adapted to co-operate with fixating means allowing fixation of the locking element in the safety position. The anchor may further comprise locking means adapted to receive a padlock for locking the locking element in the safety position.

To provide maximum protection against unauthorised removal of the safety-anchor, it is a particular aspect of the invention that it is designed with a long rod such that the gear-box and threaded tip are driven deep into the ground thereby assuring that any unauthorised attempts to remove it would require a substantial digging effort.

In a particular aspect of the invention the two piece safety anchor (rod and threaded tip) serves as the basic unit onto which other units can be mounted. For instance, the rod of the safety anchor may carry a universal mount that allows a range of other units (that provide a range of different functionalities) to be readily attached - and locked to the safety anchor.

In another preferred embodiment of the invention safety screws are provided that consist of at least a screw and a code lock (code safety screw). The screw comprises a threaded region for anchoring the screw, a locking region that enables the attachment of the code

lock and a screw-head for applying torque to the screw. When mounted in for instance a wall, the locking region protrudes from the wall and is thus accessible for attaching the code lock. Once attached and locked, the code lock i) cannot be detached, ii) can rotate freely both clockwise and counter-clockwise and iii) prevents the locking region of the screw and the screw-head to be accessed by gripping tools.

The code safety screw thus behave as an ordinary screw that can be fastened or removed by either clockwise or counter-clockwise rotation using appropriate tools to apply torque to the screw-head. Once the screw is fastened satisfactory it can then be converted into a safety screw that cannot be removed by unauthorised persons by attaching the code-lock and locking it.

The lock and screw parts of the code safety screw according to the invention can have a range of different designs thus providing many manufacturing options. Figure 8 depicts one such design. A person skilled in the art will appreciate that the described functionalities of both the screw and lock can be obtained with a variety of other designs and locking principles, which thus fall within the spirit of the invention. Briefly, the screw part of the code safety screw comprises a threaded region that is separated from the code lock accepting region (locking region) by a fixed disc that ensures that the screw is inserted to the appropriate depth in the material to subsequently facilitate the attachment of the code lock. The locking region has a cylindric shape with one or more pegs and also comprises the screw-head for applying torque to the screw. In its simplest form the code lock comprises several numbered discs, such as from 2 to 10 discs, preferably from 3 to 8 disks and most preferably from 4 to 6 discs. Directly behind one of the numbers on each disc is a notch that will be just large enough to allow the pegs to move through. When the correct code is entered, the notches align with the pegs on the locking region on the screw, thus allowing the lock to be attached to, or removed from, the locking region of the screw. Conversely, when incorrect codes are entered the pegs will position behind the solid part of the discs and thus prevent a mounted code lock from being removed.

In a preferred embodiment, the code lock enables the owner of the lock to change the code. Figure 9 shows an example on how such a code lock can be constructed. Briefly, the lock comprises a centre rod that holds alternating numbered discs and smaller discs, the latter of which each has a small part of their exterior removed to create an indent. The numbered discs engage the smaller discs such that when the numbered discs are rotated so are the smaller discs. Pressing against each of the smaller disks are spring-activated pins whose other end can protrude into a cylindrical cavity into which the locking region of the screw can be inserted. The locking region of the screw carries notches that spans its circumference and enables locking engagement with the part of the pins that can protrude into the cylindrical cavity. When the correct code is entered, the smaller discs are aligned such that the pins are opposite the indents. In this position the pins do not protrude into the cylindrical cavity and the lock can be detached from the screw. When incorrect codes are entered the smaller discs forces the pins into locking engagement with the locking region of the screw which can thus not be removed. To change the code, the correct code is entered and the centre rod that holds the numbered discs and the smaller discs are

moved such that the numbered discs and smaller disks are disengaged. The numbered discs are then rotated to the desired new code after which the centre rod is moved back to re-establish locking engagement with the smaller discs.

In the above examples the code lock is purely mechanical and have the disk combination type lcok. Several other types of locks, however, are also possible including without limitation dial combination or push-button combination type locks or electrically powered code locks.

The code safety screw is particularly well suited for securing valuable items and devices, which typically have a fixed location but which the owner would want to be able to easily move on a regular basis without the use of any tools. These include, but are not limited to, devices and items such as computers, computer screens, printers, televisions, paintings, stereo equipment, loud speakers etc. that are typically located at fixed positions on floors, tables, walls etc. but which need to be removed occasionally for cleaning, repair, etc.

In a typical situation, the screw part of the code safety screw would be fastened into a wall, after which the device to be secured would be mounted on the protruding locking region of the screw, followed by attachment of the code lock. In some instances it may be possible to drill a hole in the device to be secured whereas in other cases it will not. In these cases a mount specifically designed for securing the particular type of item or device may be used. In any case, to be broadly useful the code safety screw must be compatible with differences in material thickness of the various items and devices the owner wants to secure. As such, the gap size between the base of the mounted code lock and the fixed disc on the screw must on the one hand be large enough to accommodate different material thickness whilst on the other hand be small enough not to leave a portion of the locking region on the screw exposed to handling by gripping means that could be used for unauthorised removal. One way of achieving this is to design the code safety screw such that a gap of for instance 1- 2 cm exists between the base of the mounted code lock and the fixed disc and to use spacer rings to fill up the gap after mounting of the device. A person skilled in the art will appreciate that other solutions exists which thus fall within the spirit of the invention.

In a preferred embodiment, the code safety screw is provided as a kit that comprises a number of screws of different sizes but with identical dimensions of the locking regions, a code lock and a set of spacer rings. A variety of materials such as for instance plastics, polymers and metals may be used for manufacturing the screw part and code lock part of the code safety screw and more than one material may be used. Likewise, the screw part of the code safety screw can be manufactured with all standard gripping means such as for instance the normal hexagonal blot heads for spanners and monkey wrenches, but also countersunk screw-heads for Allen keys, ordinary screw drivers, Parker's screw drivers etc. Also, the principle of the invention applies equally well to other types of fasteners than screws, such as for instance bolts.

The drawings

For a fuller understanding of the nature and objects of the invention, reference is given to the following detailed disclosure and accompanying drawings, in which:

Fig. 1 shows a side view of a possible design of a push-down safety screw, *i.e.* an irreversible safety screw in which the switch between the operational and safety state is controlled by driving the locking pal into the safety screw.

Fig. 2 shows a side view of a possible design of two torque safety screws, *i.e.* an irreversible safety screw that auto converts into a safety screw when a pre-determined torque is applied to the screw.

Fig. 3 shows a side view of a possible design of pull-out safety screw, *i.e.* a reversible safety screw in which the switch between the operational and safety state is controlled by the removal/insertion of a locking element.

Fig. 4 shows a side view of a possible design of a lock safety screw, *i.e.* a reversible safety screw in which the switch between the operational and safety state is controlled by a code lock.

Fig. 5 shows a number of possible ways in which the threaded tip and rod can be designed to facilitate different manufacturing and assembly processes.

Fig. 6 shows a possible embodiment of a safety anchor according to the invention,

Fig. 7 shows details of the top part of the safety-anchor,

Fig. 8 shows a possible design of a code safety screw.

Fig. 9 shows details of a code lock for a code safety screw, which enables the owner of the lock to change the code

Detailed description of the invention

By referring to figures 1-9, along with the following detailed disclosures, the construction and operation of the various safety screws according to the invention can be best understood. The drawings and the following detailed disclosure, fully discloses the present invention. However, the present invention can be implemented using alternate constructions which alternate constructions are therefore intended to be within the scope of the present invention.

Fig. 1. Side view of a possible design of push-down safety screw. Threaded tip **1**, a joint **2**, a rod **3** carrying a screw-head **4** which allows attachment of a device that facilitates rotational movements of the screw, and a locking element **5** consisting of a middle section that can rotate freely in the locking channel **6** and a distal thickening **7** which fits the locking channel and enables rotational coupling/decoupling between the rod and the threaded tip and a proximal thickening **8** that fits the locking channel and serves to steer the locking element during movement and which is accessible from the screw head. **A:** When the distal thickening is located across the joint between the rod and threaded tip, rotational force applied to the rod is transmitted to the threaded tip. **B:** The locking channel extends sufficiently deep into the threaded tip that it can accommodate the entire distal thickening of the locking element. Thus, when mounting of the safety screw is satisfactory, it can be secured against removal by applying a force to the proximal end of the locking element such that it is driven into the threaded tip, thereby decoupling rotational movement between the rod and threaded tip.

Fig. 2. Side view of a possible design of two torque safety-screws. **A:** The first screw design comprises a threaded tip **1** a joint **2**, a rod **3** carrying a screw-head **4** which allows attachment of a device that facilitates rotational movements of the screw and a torgue locking element **9** that fits the locking channel **6** and which locks the transmission of rational movement from the rod to the treaded tip and which breaks when a pre-determined torque is applied. **B:** The second screw design comprises a threaded tip **1** a joint **2**, a rod **3** carrying a screw-head **4** which allows insertion of a device that facilitates rotational movements of the screw and a torque locking element **9** which is an integral part of the rod that protrudes from its end and fits a matching cavity **10** in the threaded tip and which breaks when a pre-determined torque is applied.

Fig. 3. Possible design of a pull-out safety screw. **A:** Side view of the pull-out safety screw comprising a threaded tip **1**, a joint 2, a rod **3** carrying a screw-head **4** which allows attachment of a device that facilitates rotational movements of the screw, and a locking element **5** that fits the locking channel and couples rotational movement between the rod and the threaded tip and which has a head **11** that is accessible from the screw head and allows it removal **B:** Top view of the screw-head showing the head of the locking element **11** and grooves **12** which facilitates the removal of the locking element. **C:** Side view of the pull-out safety screw with the locking element removed to prevent unauthorised removal.

Fig. 4. Side view of a possible design of lock safety screw. Threaded tip **1**, a joint **2**, a rod **3** carrying a screw-head **4** which allows attachment of a device that facilitates rotational movements of the screw and contains the lock **13** which (upon insertion of for instance a key) serves to move the locking element **5** located in the locking channel **6** between a rotationally locked and unlocked position. **A:** Lock safety screw in the locked position where the locking element spans the joint between the rod and threaded tip. **B:**

Lock safety screw in unlocked position where the locking element is located in the rod part of the safety screw.

Fig. 5 shows a number of possible ways in which the threaded tip and rod can be designed to facilitate different manufacturing and assembly processes. **A:** threaded tip **1**, closed flanged joint **14** for end-to-end assembly, rod **3**. **B:** threaded tip 1, open flanged joint **15** for side-to-side assembly, rod **3**. **C:** Threaded tip **1**, open joint with locking ring **16** for end-to-end assembly, rod **3**. **D:** Threaded tip **1**, connective part **17** for end-to-end assembly of flanges on threaded tip and rod **3**. **E:** threaded tip **1**, first 18 and second **19** half of rod for sideways assembly around flange on threaded tip. **F:** Threaded tip **1** carrying unidirectional thread **20**, which facilitates assembly (but not disassembly) by screwing with rod **3** carrying matching unidirectional thread **21**.

Fig. 6, a multifunctional safety-anchor suitable for attaching a beach-safety-box, a sun-parasol etc. may comprise a threaded tip **1** adapted to drive the safety-anchor into the ground and thus for fastening the safety anchor to the ground, a joint **2**, a rod **3**, a locking element **5**, a stop plate **22** to indicate when the safety-anchor has reached its correct depth and to stabilise the safety-anchor in a vertical position, a hole **23** to accommodate the rod of a sun-parasol (works in combination with the eyelet designated 25), a loose installation-bar **24** to enable a user to drive the safety-anchor into the ground, an eyelet **25** to accommodate the rod of a sun-parasol, a storage channel **26** for the installation-bar, a screw cap **27**, mounts **28** for a beach-safety-box, handle **29** for switching the locking element between rotationally locked and unlocked positions and an eyelet **30** for attaching bags, pets, etc to the safety anchor.

Fig.7 shows details of the top part of the safety-anchor comprising locking element **5**,locking element handle **29** for switching the locking element between rotationally locked and unlocked positions, hole **31** in locking element handle which, in combination with the upper hole in the beach-safety-box mount **32**, can be used to secure the locking element handle in the non-transmitting mode using a padlock (for securing the safety-anchor against unauthorised removal in cases where the beach-safety-box is not mounted), storage channel **26** for loose installation-bar and screw cap **27**.

Fig. 8 shows a graphical representation of a possible design of a code safety screw. **A:** Threaded region **33**, fixed disc **34**, which ensures that the screw is inserted to the correct depth in the material, and locking region **35** which carries the screw head **4**, which allows attachment of a device that facilitates rotational movements of the screw, and one or more pegs **36** which serves as anchor point for the code lock **37**. In its basic form the code lock consists of a central housing **38** comprising a channel **39** with a diameter slightly bigger than the outer diameter defined by the pegs on the locking region of the screw, and one or more numbered rings **40** that have inter-disc distance **41** slightly bigger than the width of the pegs on the screw. Each of the numbered rings have a circular hole **42** in their centre that fits the diameter of the screw's locking region excluding the pegs, and a notch **43** behind one of the numbers that is just large enough to allow the pegs to move through.

When the correct code is entered, the notches in the code lock align with the pegs on the locking region on the screw, thus allowing the lock to be attached to, or removed from, the locking region of the screw. Conversely, when incorrect codes are entered the pegs will position behind the solid part of the discs and thus prevent a mounted code lock from being removed. **B:** Screw with attached code lock showing how the pegs **36** locate behind the numbered rings of the code lock once mounted. Also shown is the gap **44** between the base of the mounted code lock and the fixed disc of the screw, which enables the safety screw to be used with a range of different mounts and devices.

Figure 9 shows an example of a code safety screw that can be programmed by the user. The lock comprises central housing **38** which holds a centre rod **45** onto which is mounted alternating numbered discs **40** and smaller discs **46** the latter of which each has a small part of their exterior removed to create an indent **47**. The numbered discs engage the smaller discs such that when the numbered discs are rotated so are the smaller discs. Pressing against each of the smaller disks are spring-activated pins **48** whose other end can protrude into a cylindrical cavity **49** into which the locking region 35 of the screw can be inserted. The locking region of the screw carries notches **50** that spans its circumference and enables locking engagement with the part of the pins that can protrude into the cylindrical cavity. When the correct code is entered, the smaller discs are aligned such that the pins are opposite the indents. In this position the pins do not protrude into the cylindrical cavity and the lock can be detached from the screw. When incorrect codes are entered the smaller discs forces the pins into locking engagement with the locking region of the screw, which can thus not be removed. To change the code, the correct code is entered and the centre rod **45,** which is in longitudinal (but not rotational) lock with the smaller discs, is pressed inward against the bottom spring **51.** This inward movement disengages the rotational lock between the numbered discs and smaller disks. The numbered discs can thus be rotated to a desired new code after which the centre rod is moved back to re-establish locking engagement with the smaller discs.

Having described our invention, what we claim as new and desire to secure by Patent are:

Claims

1. A safety fastener to be secured by screwing, said fastener comprising at least a threaded tip and a rod, the threaded tip and rod being interconnected in a joint allowing transmission of rotational movement from the rod to the threaded tip in one locked state and prevents transmission of rotational movement from the rod to the threaded tip in another unlocked state.

2. A safety fastener according to claim 1, wherein the end of the rod opposite to the threaded tip comprises a gripping means for applying a torque to the rod.

3. A safety fastener according to any of claims 1 and 2, wherein the joint is locked by the insertion of a locking element into a rotationally locking engagement in the rod and the threaded tip.

4. A safety fastener according to claim 3, wherein the rod and threaded tip comprises a hollow channel that houses the locking element.

5. A safety fastener according to any of claims 3 and 4, wherein the locking element is accessible from a top portion of the rod opposite to the threaded tip so as to allow shifting between the locked and the unlocked state on a mounted safety fastener.

6. A safety fastener according to any of claims 3-5, adapted to allow reversible shifting between the locked and the unlocked state by displacement of the locking element in the axial direction of the fastener.

7. A safety fastener according to any of claims 5 and 6, further comprising a handle member arranged to control the moving of the locking element from a top portion of the rod, opposite the threaded tip.

8. A safety fastener according to any of claims 5-7, further comprising fixating means allowing fixation of the locking element in any of the first and/or the second positions.

9. A safety fastener according to any of claims 5-8, further comprising locking means adapted to receive a pad-lock for locking the locking element in either the locked and/or the unlocked states.

10. A safety fastener according to any of claims 5-7, wherein the joint is shifted between the locked and unlocked state by respectively removing and inserting the locking element into the safety screw.

11. A safety fastener according to any of claims 1-5, wherein the joint is shifted from the locked state to the unlocked state by displacing the locking element in a direction from the rod towards the threaded part.

12. A safety fastener according to any of claims 1-4, wherein the joint is shifted from the locked state to the unlocked state by irreversible breaking of the locking element.

13. A safety fastener according to claim 12, wherein the locking element is adapted to break at a pre-specified torque.

14. A safety fastener to be secured by screwing, said fastener comprising at least a screw part and a lock part, the screw part comprising at least a threaded region and a lock accepting region and wherein attachment and locking of the lock to the lock-accepting region removes the ability to apply torque to the screw.

15. A safety fastener according to claim 14, wherein the lock-accepting region comprises a gripping means for applying torque to the rod.

16. A safety fastener according to any of claims 14 and 15, wherein the lock is a code lock comprising from 2 – 12 numbered discs.

17. A safety fastener according to claim 16, wherein the user can program the lock.

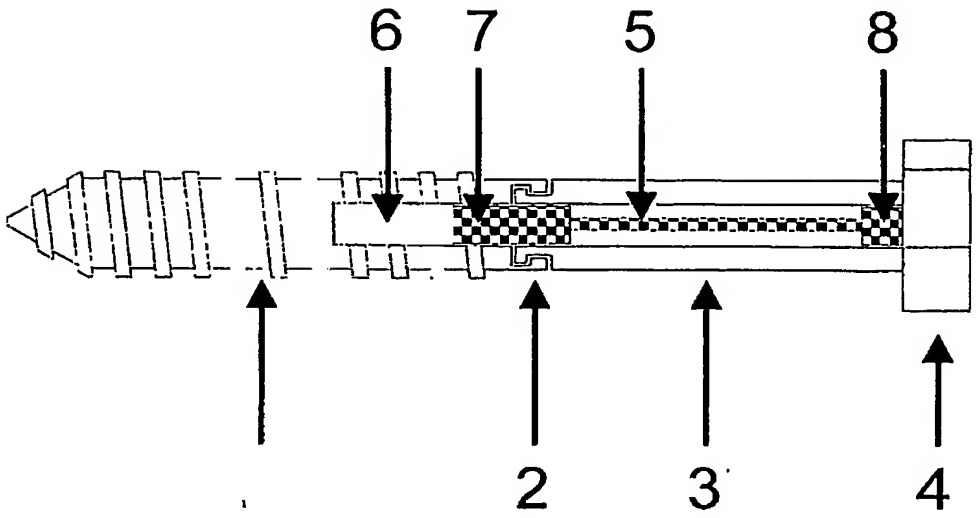
18. A safety fastener according to any of the preceding claims, wherein the threaded part contains at least 5 threads.

19. A safety anchor according to any of the preceding claims, wherein the length of the threaded part is at least 50% of the entire length of the safety anchor.

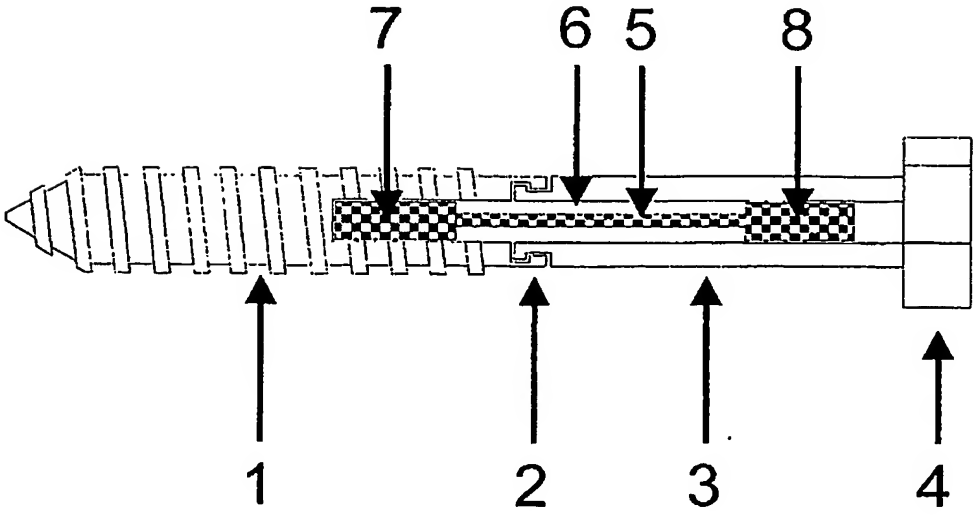
20. The use of a safety fastener according to any of the preceding claims, to secure objects against unauthorised removal.

Modtaget
20 JAN. 2003
PVS

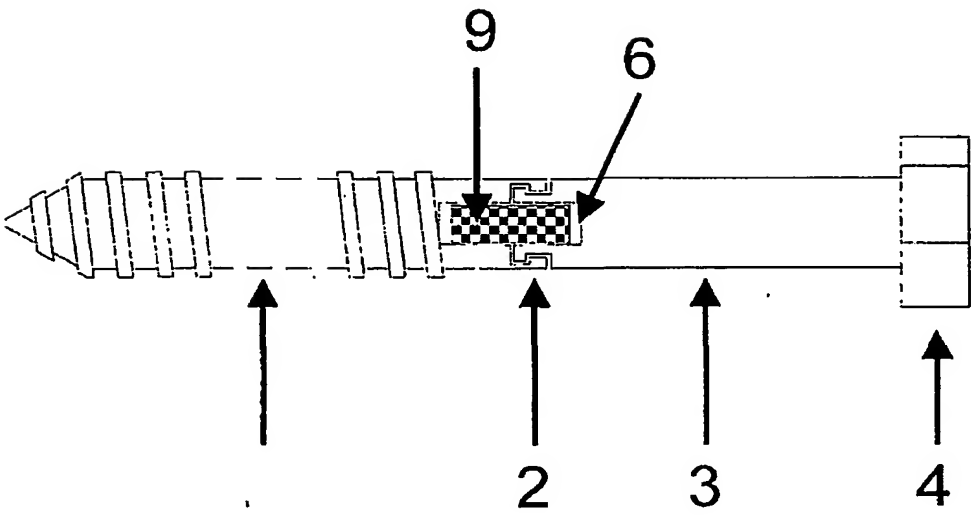
A



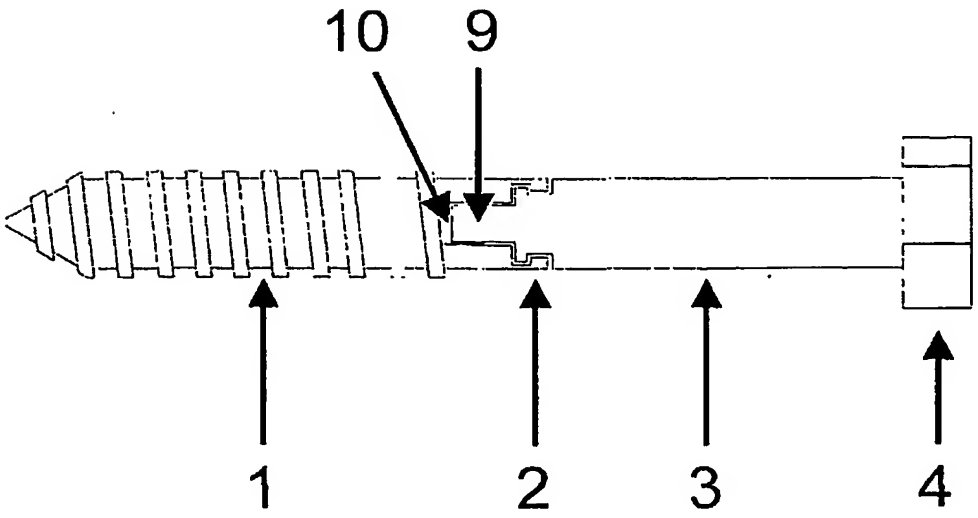
B



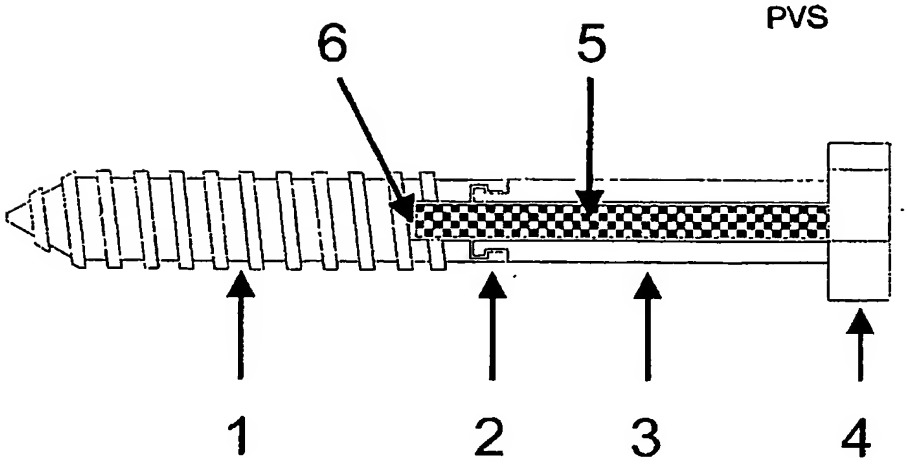
Modtaget
20 JAN. 2003
PVS



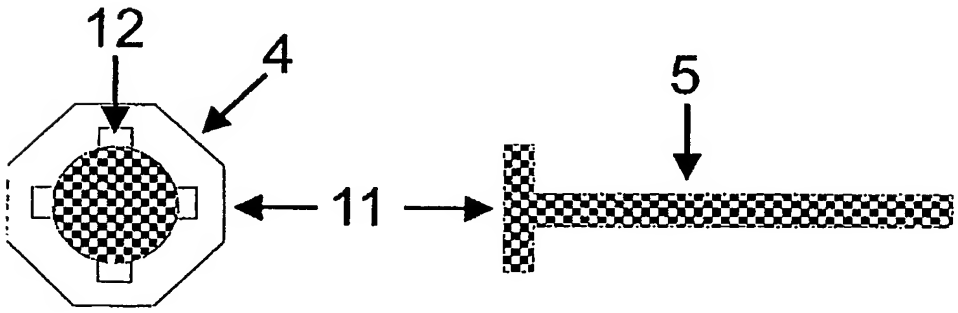
B



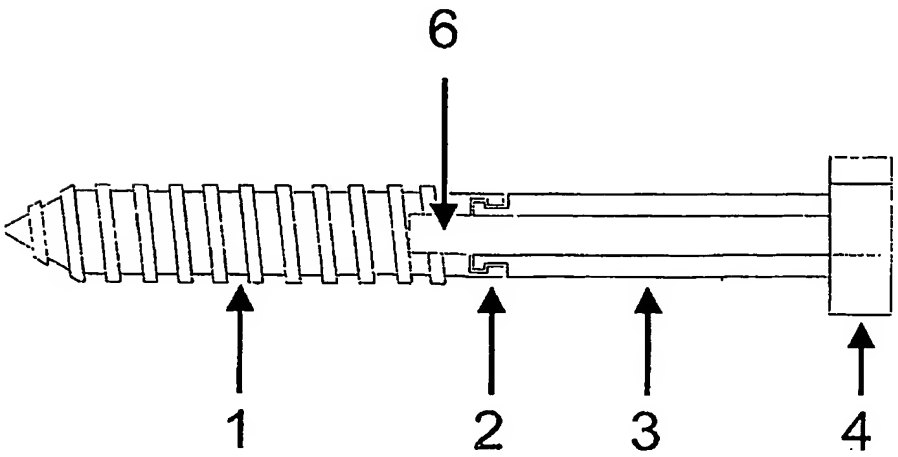
A



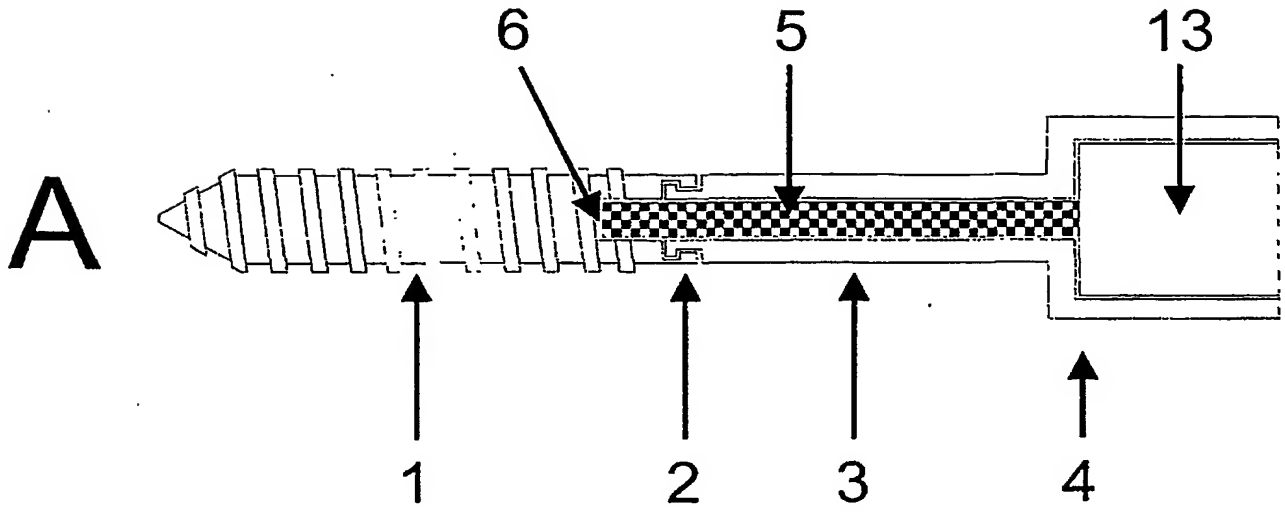
B

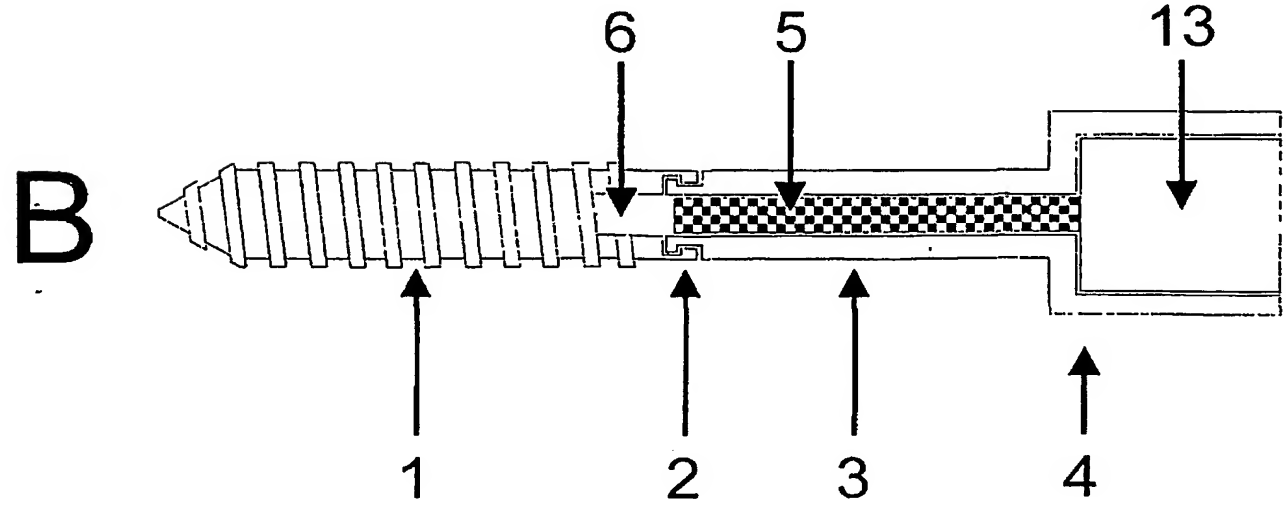


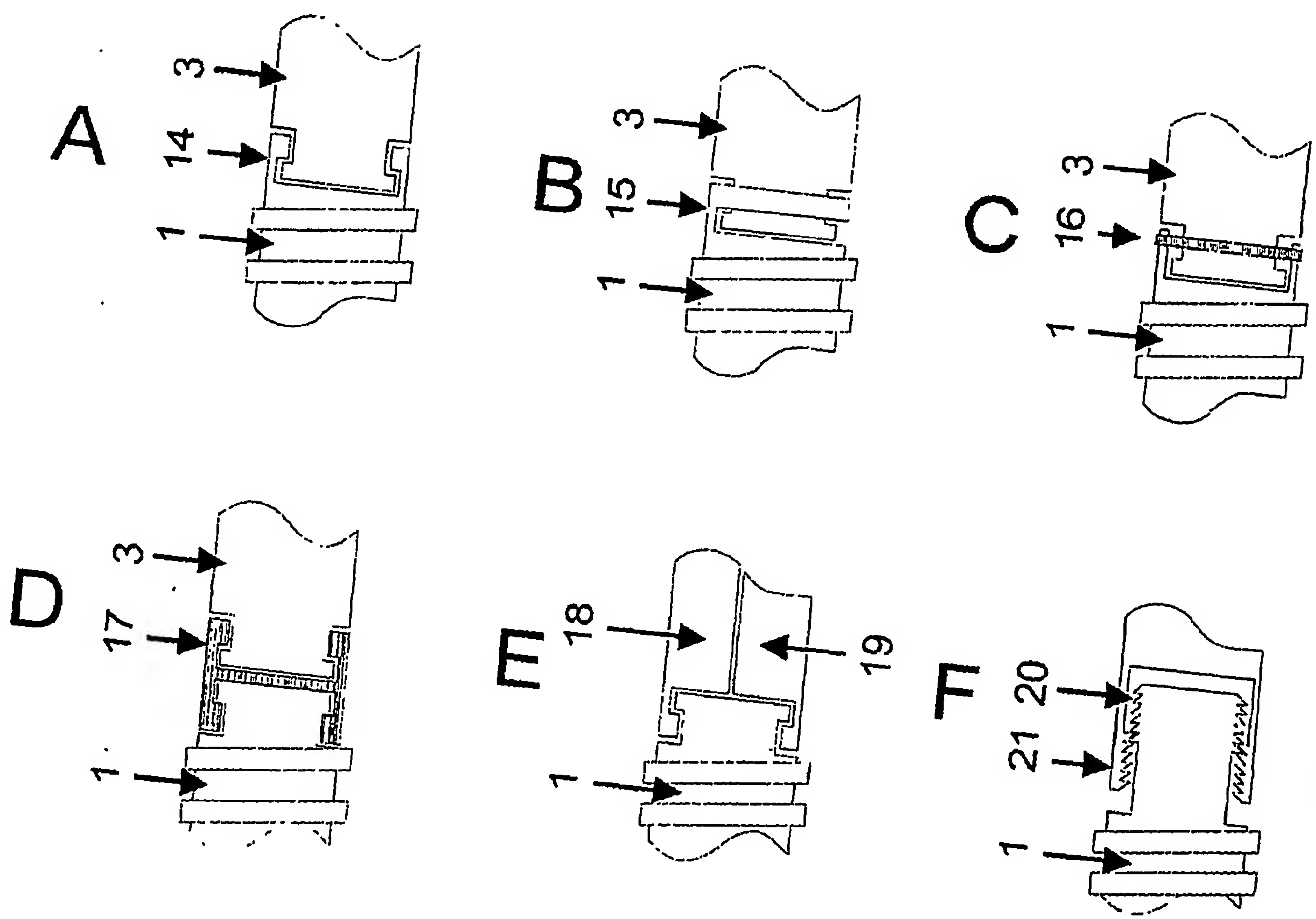
C

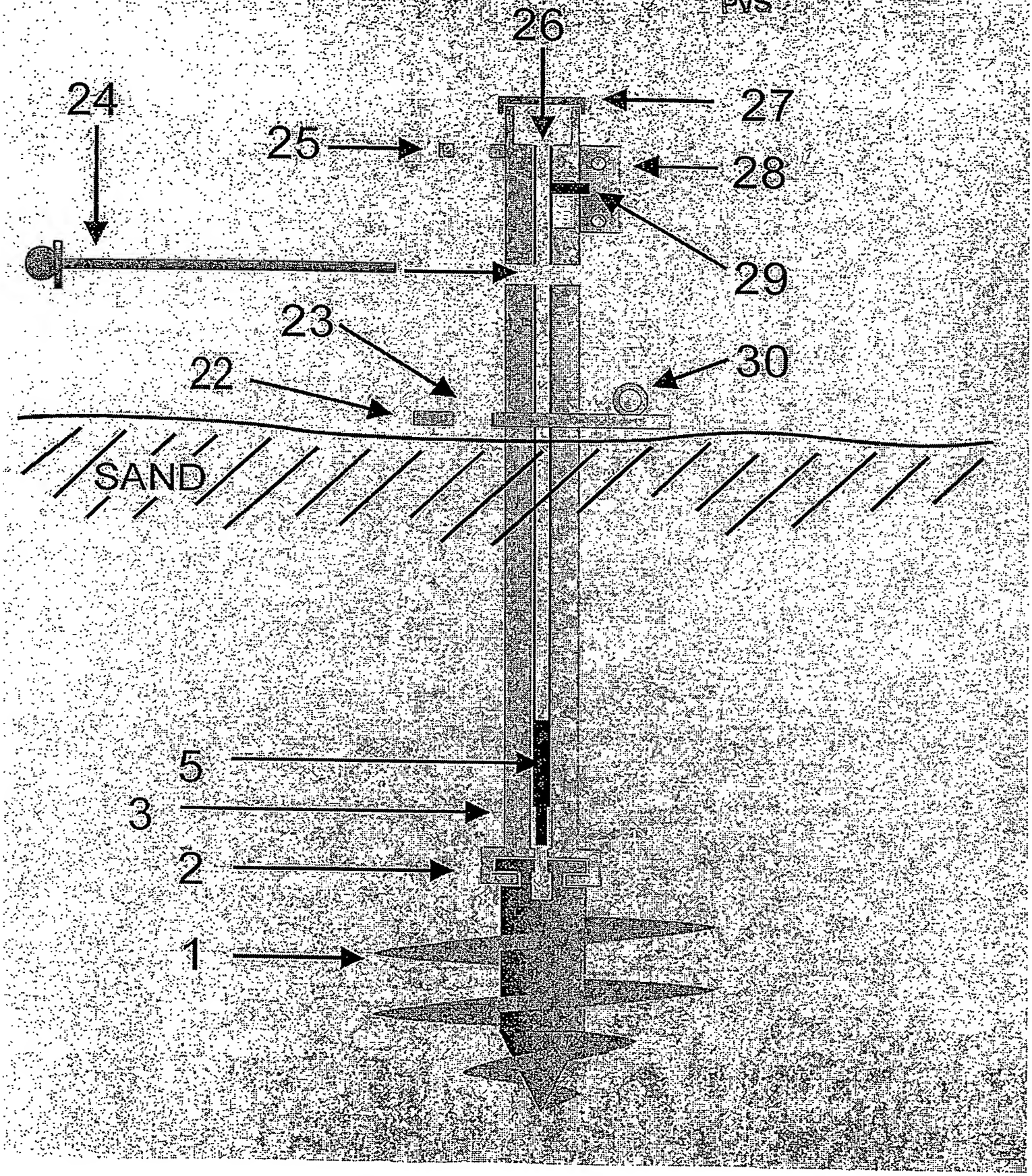


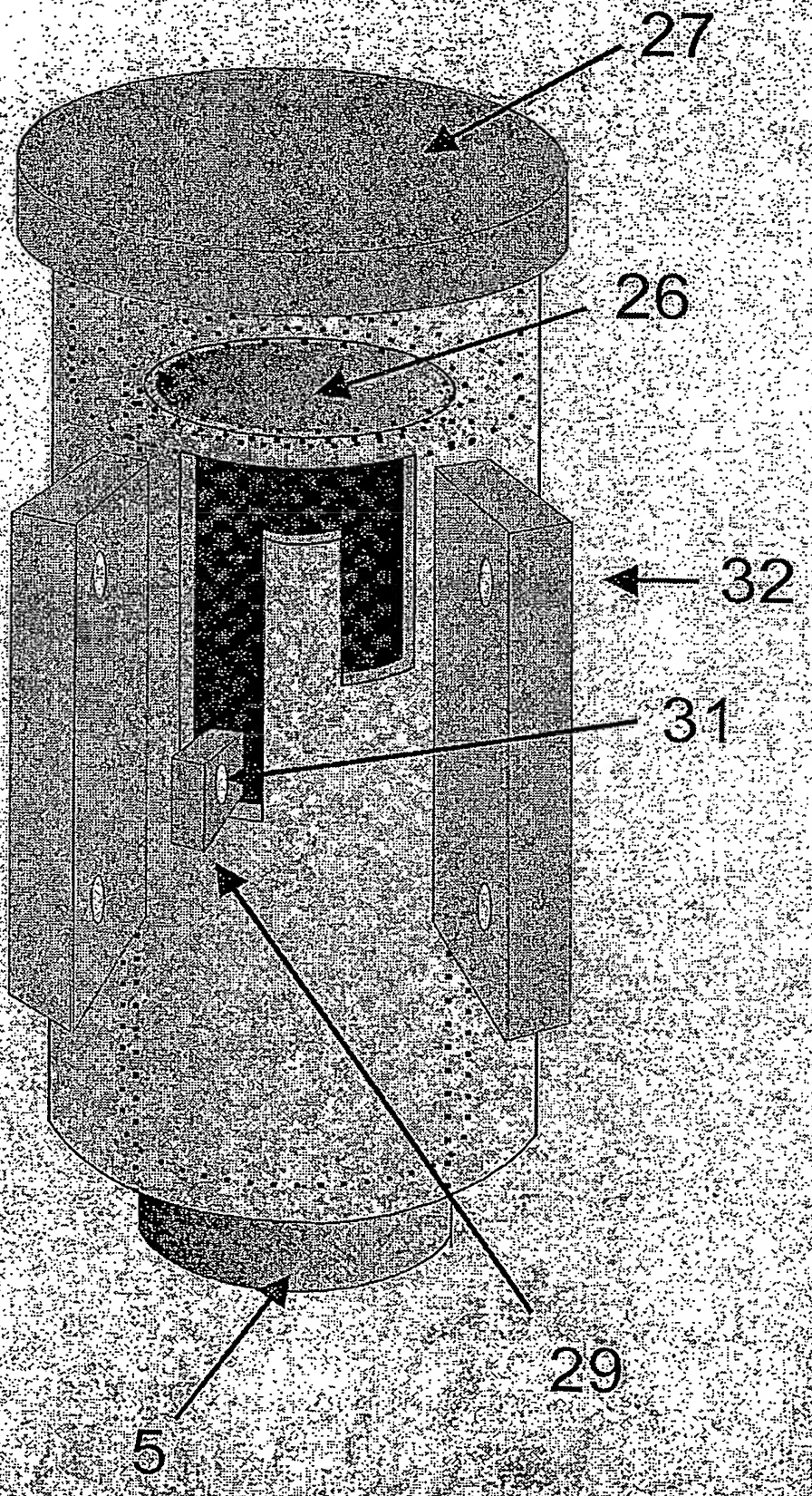
Modtaget
20 JAN. 2003
PVS

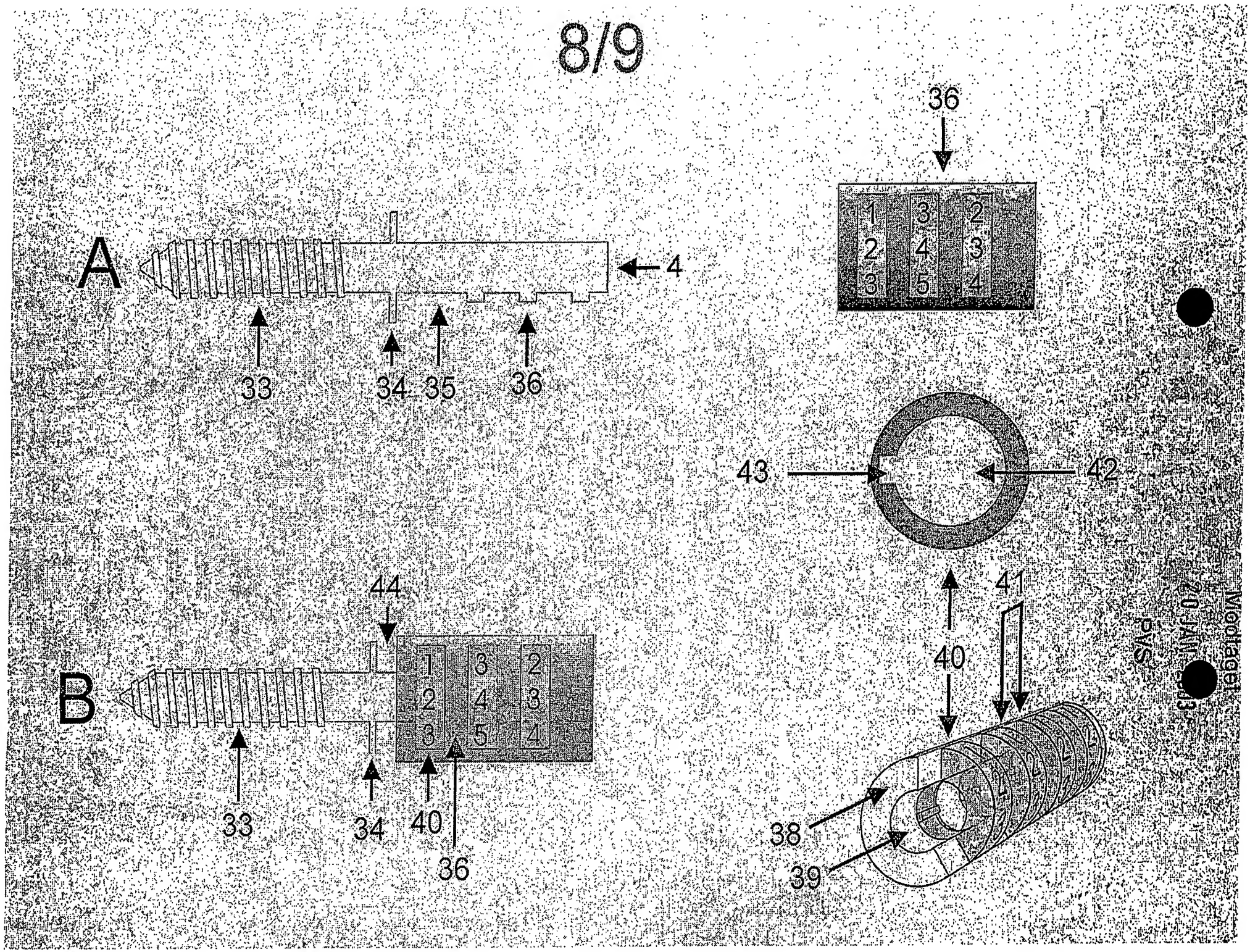











A
4
33
34
35
36
B
44
33
34
40
36
36
1 3 2
2 4 3
3 5 4
43
42
41
40
38
39
Modtaget
20 JAN 03
PVS